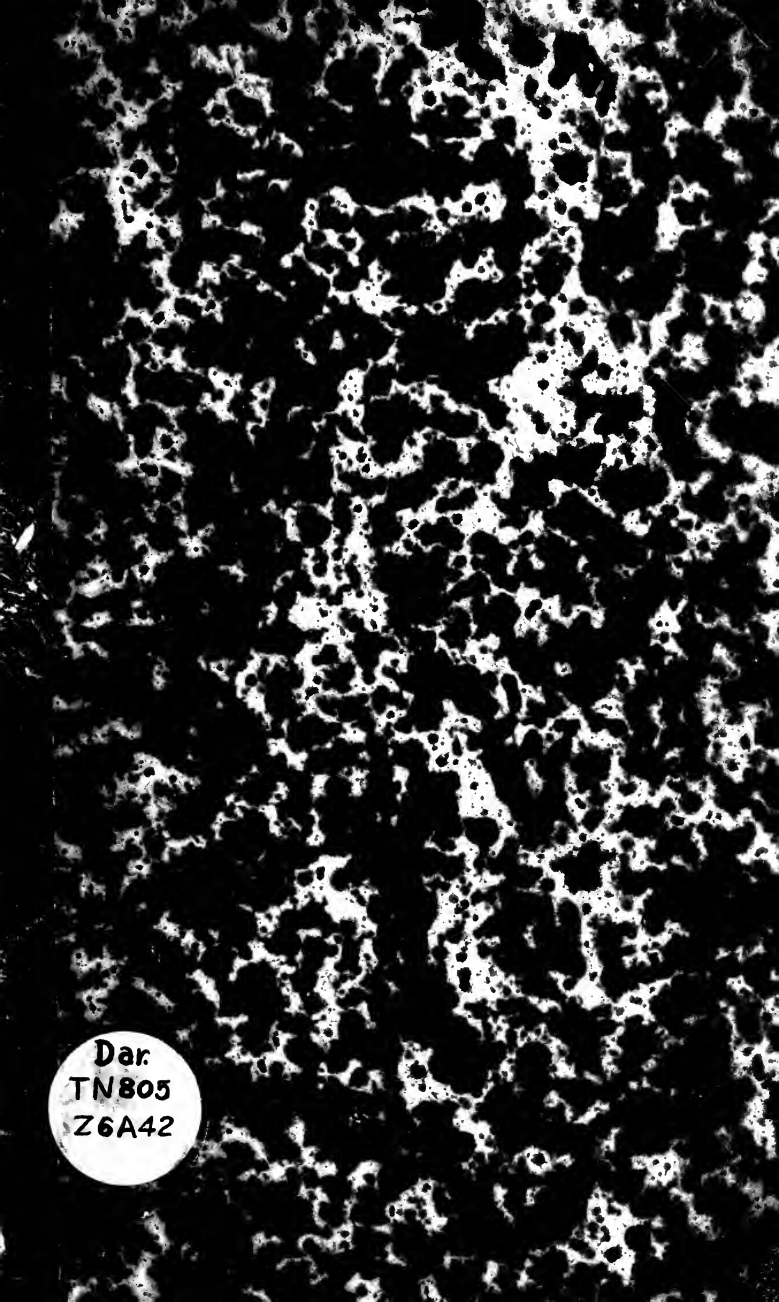
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REPORT

OF A

SURVEY AND EXPLORATION

OF THE

COAL AND ORE LANDS,

BELONGING TO THE

Allegheny Coal Company,

IN

SOMERSET COUNTY, PENNSYLVANIA,

ACCOMPANIED BY MAPS, PROFILES, AND SECTIONS.

BY WALTER R. JOHNSON, A. M.

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REPORT.

To the Allegheny Coal Company.

Gentlemen:

Having examined and surveyed the lands constituting your domain, situated in Southampton township, Somerset county, Pennsylvania, I beg leave to offer the following results of my investigations.

The plan of conducting this survey was, after having made some preliminary reconnoissances to obtain a general knowledge of the structure of the country, and the limits of the mineral deposits, to determine the general direction of the strata, and their inclination in different parts of the region. These points having been approximately decided, the next object was, to fix by careful survey and levelling, the relative positions of the several beds, and of the interposed strata of rocks. This purpose was effected by carrying lines longitudinally and transversely over the main dividing ridge between the waters of Jenning's and Gladden's run, from the Little Allegheny, to the Savage mountain, and connecting, as they were severally reached, the different exposures of the various beds.

By thus ascertaining the position and elevations of the beds as found in different parts of the formation, it was a matter for comparison and calculation, to fix the section of the coal-trough in each direction; and to compute its depth and other dimensions. Having completed these surveys and levellings for geological purposes, the other objects to be effected on the ground, were to ascertain the length and grade of a line of rail-road which might connect the lands of the company with the line of public improvements, by which they might be rendered available; and to measure the thickness of the several mineral deposits, taking from each the proper samples for analysis. The field work being thus completed, it became necessary to arrange all the data thus obtained, to plot and reduce the maps, profiles, and sections; and to go through an analysis of coals, iron ores, and limestones, found in the various exposures of the beds.

The lands of your company lie in the north-easterly part of the coal-trough, which is situated partly in the state of Pennsylvania, and partly in Maryland and Virginia. Those lands are chiefly situated on a ridge of considerable elevation, which divides the north fork of Jenning's run, from the south-westerly heads of Gladden's run. This ridge may be traced from Beale's Gap, in the Little Allegheny mountain, to Reiber's Gap, on the Savage mountain; and the distance from the Penn-

sylvania and Maryland line is in no part of the tract more than two and a half miles.

The situation of these lands is one of the most favourable in Pennsylvania for supplying with bituminous coal the great Atlantic market. After many years spent in exploration, surveys and levellings, to ascertain the most favourable route for a connection between the Potomac and the Ohio, the Baltimore and Ohio Rail-road Company have fixed upon the course of Will's creek, as the location of their road. This line of communication therefore passes within little more than two miles of the north-easterly extremity of the company's land; and the Chesapeake and Ohio Canal Company have determined on locating a basin for that work at the mouth of Jenning's run, about five and a half miles by the course of the latter stream from the coal openings on the property of your company, and only three miles by the course of Will's creek, above the town of Cumberland. The locations to which I have just referred will be found to render the north-eastern extremity of the Southampton coal field more accessible than any other portion of this rich and valuable basin. While such is the situation of these lands with reference to lines of the public works—and while the products of the mines may find through the channel of the Chesapeake and Ohio Canal, a transportation not exceeding 190 miles, with a descent of 690 feet, to reach tide-water, the lands them-

selves are so situated as to render the prosecution of mining operations far less expensive than in many other situations. Many of the mineral beds can be approached and worked without vertical shafts, or slopes requiring stationary power for extracting the materials. Six workable beds of the coal are wholly above water-level; and portions of those which, at the centre of the basin, lie beneath that level, rise at their out crops to a high elevation on the flanks of the two mountains which constitute the boundaries of the basin.

This circumstance of working by horizontal drifts instead of vertical shafts, and that of finding a conveyance to market, without the necessity of constructing long lines of private rail-road, are advantages possessed by few of the bituminous coal districts, of which the products will seek the Atlantic market. By a reference to subsequent parts of this report, it will be found that the distance over which a company rail-road, to connect the coal of this basin with the canal as above mentioned, must be made, is not above five and four-fifth miles; and that the first coal beds reached on this route, are not more than three and a half miles from the canal basin at the mouth of Jenning's run, and at an elevation of 290 feet above that point. These latter beds, which have formerly been worked to a limited extent, are therefore but 980 feet above tide, with a continuous descent. The advantage which a rail-

road constructed from the mouth of Jenning's run to the coal mines of the company would enjoy, would not be limited by the accommodation it would afford to their own operations, but it would profitably accommodate the trade descending along the south fork of Jenning's run, from the neighbourhood of Frostburg. This source of revenue might be safely calculated on, as the rich mineral beds of the company are known to extend in that direction; and their value, both for the supply of coal, and for the manufacture of iron, has been already demonstrated.

To the above general remarks I may add, that the richness of this coal formation in argillaceous carbonates of iron and in limestone, is such, as to warrant the establishment and prosecution of iron works, on the most extensive scale which the necessities of the country shall require. When this, and similar coal districts of our country, come to be duly appreciated, there will, I conceive, be a total cessation of the ruinous practice of contracting debts abroad for supplying this important article of consumption—an article, which there appears to be as little need of bringing from abroad into the United States, as there is of importing the raw cotton of India, the timber of Norway, the wheat of Poland, or the bricks of Holland.

GEOLOGICAL CHARACTER OF THE COUNTRY.

The character of the formation in which the coal of Southampton exists, is in all its leading features entirely similar to that found in other bituminous coal regions, both of the old and new world. It is a secondary formation, reposing in a trough or canoe-shaped cavity, between two upheaved ridges which run nearly parallel to each other in a direction from north-east to south-west; and consequently the strata which are inclined towards a central north-east and south-east line dip from one of these ridges, (the Savage mountain,) towards the south-east, and from the other, (the Little Allegheny mountain,) they dip towards the north-west. In the central line, the position of the strata becomes, of course, for a short distance, nearly horizontal; and as we recede from this line they are seen to be more and more highly inclined to each other.

The evidences of the true character of the two ridges, that of up-curved portions of the stratification, were abundantly presented to view at the several gaps in these ridges, which I was enabled to visit; and on both sides of the coal field I traced the rock formation to points where it again became inclined *from* the central line of the coal-trough in question.

Thus, in passing through the gap in the Little Allegheny mountain, which affords a passage to

the waters of Gladden's run, I was enabled to observe at Compt's old mill-dam, an inclination S. 75 degrees, E. 81 degrees; while at Mattinger's shop higher up the stream, the inclination is N. 45 W. 85 degrees. Between this point and Emerick's mill, we find successively dips in the same direction, 43 and 36 degrees. At Emerick's mill, where the conglomerate rock is found in place, and a little above which, a bed of coal is opened, the inclination is still north-west, but the angle has diminished to 22 degrees. At Daniel Hoyman's, on the road which ascends the south branch of Gladden's run, the slate rock has a dip N. 38 W. of 9 degrees; and at Baker's place, N. 28 W. 8 degrees. At Gaumer's big vein it is N. 15 W. 5°. These last three observations appear to favour the supposition that the ridge between the waters of Gladden's and Jenning's runs, is in fact saddle-shaped, dipping into the valleys of the streams, as well as towards the centre of the trough, as already mentioned.

At the mouth of Jenning's run, the rocks were observed to dip N. 45° W. 80°.

At a crossing of Jenning's run, below the junction of the north and south forks, the dip was found to be N. 51° W. 65°. On the red shale rock some distance below the conglomerate, N. 40½ W. 17°; from this point to Uhl's mill, the inclination of the strata cut through by the stream appears to diminish gradually, until at the latter

point, it is N. 45 W. 4½ degrees. Some additional facts were observed with respect to the inclination of the rocks, on the flank of the Little Allegheny, particularly north of Beale's Gap, where the conglomerate standing high above the other members of the coal series, probably on account of its greater degree of durability, has an inclination N. 45 W. 60°. At Beale's Gap also, the sandstone above the conglomerate dips N. 50 W. 33°; but having passed from this point over the edges of several of the lower beds of coal and their interposed rocks, towards the synclinal axis or bottom of the trough, we perceive the formation to be gradually becoming more and more nearly horizontal, until we reach the rounded hill near the house of Henry Hoyman, which seems to repose in the centre of the trough, and to contain some higher members of the original formation than are met with in any other part of the trough over which my lines of survey extended. From the base of this central bluff we advance towards the north-west, up the flank of the Savage mountain, over strata, at first only moderately inclined, and find, as we proceed, still further evidences of the saddle-shaped figure assumed by the strata, constituting the ridge.

Thus we have on the south-westerly side of the ridge at Hardin's old and new openings, a dip S. 8 W. 6°, instead of S. 45.° E., as we might expect from the general bearing of the mountain

ranges and of the main axis of the coal-trough. On the other hand, above Daniel Lepley's, on the Gladden's run side of the ridge, the inclination is S. 60 E. 24°—then S. 55° E. 15°—and not far below, on the Jenning's-run side of the slope, S. 30 E. 15°. S. 35 E. 17°. All these observations are within a few rods of each other, and indicate that the waters of the two runs, have, in excavating their channels, more than 1000 feet deep into the formation, been directed by other than accidental circumstances, in reference to the courses which they have respectively traced. Instead of finding the basset edges or out-crops of the several beds in a straight line along the flanks of the two mountains, we ought, if the results of the foregoing observations be properly estimated, to have scolloping or waving lines of crop, in situations where their upper lines are observed.

Following the general course of the inclination, we notice on the flank of the Savage mountain, on the old Somerset road, below its junction with the turnpike, the dip S. 45 E. 20°. On the conglomerate rock, in place near Reiber's gap, S. 38° E. 23°. At Reiber's new ore bed, S. 45 E. 31°; and on the ridge of the Savage mountain, was observed a dip of the grey sand-stone, composing it, S. 45 E. 40°. On passing further to the north-westward, and crossing Savage run, Laurel run, the Scaffold Camp fork, and arriving at the head waters of the Flaugherty's creek, we cross over a line of anti-

clinal elevation, and find at length a dip N. 48 W. 18 degrees. This comes in fact to the westerly slope of the Allegheny mountain.

We thus discover, that the coal-trough under consideration, reposes in one of the downward flexures or *wrinkles* of the stratification, so common in Middle Pennsylvania, and which, combined with the extensive denudation of certain parts of the elevated strata, render the geological interpretation of the present surfaces somewhat more intricate than they would have been, if no such corrugations had taken place.

That side of the trough which reposes on the flank of the Savage mountain, and which, consequently declines towards the south-east, is found, according to the foregoing observations, to have a more rapid inclination than that which rests on the slope of the Little Allegheny. In other parts of this coal-trough, as we learn from Professor Ducatel's report on the geology of Maryland, the reverse appears to hold. Some few observations which were recorded, appear to favour the supposition, that there is on the whole, a slight south-western inclination of the whole formation in this part of the Savage mountain coal field; and that not many miles to the north-eastward, we should encounter the outcropping of the strata composing the ends of the trough.

The angles of inclination above-cited, together with the breadth of the deposit of coal mea-

sures, prove that it must possess no inconsiderable depth at the centre; and though the lowest strata of coal and iron-ore, discovered in ascending Jenning's run, soon after passing the thick bed of conglomerate rock, $3\frac{3}{4}$ miles above its mouth, together with several others of the mineral beds, between that point and the village of Wellersberg, are no more seen, on account of their dipping below the level of the creek; yet as we have many data to determine the inclination of the measures, the depth to which the lower beds must descend in the *centre*, before they again rise to the opposite side of the trough, is determined within sufficiently circumscribed limits. The number of points at which the eight feet vein of coal, seen near Hoyman's place, is opened, and the readiness with which it is distinguished from other beds, above and below it, afforded an opportunity of determining the position of the strata generally; especially on the south-eastern side of the *trough*; and the only assumption necessary, in order to locate properly the inferior beds, is, that the thickness of the several strata is constant, which, though perhaps not rigorously, is probably at least, so nearly true, as to be assumed without subjecting us to material error. It would be highly satisfactory to witness a direct development of all the members of the series above water-level in this part of the basin, by means of trenches opened upon the steep sides of the slope, exposing the edges of the strata. In the absence of this method of research, I have

sought to connect, in as unexceptionable a manner as possible, the points where openings do exist; and thus to construct a section which may serve as a general guide, subject to such corrections as future and more minute examinations shall render necessary.

An inspection of the accompanying section will show that the lower bed of coal, opened near the point where the south fork of Jenning's run, (which comes from near Frostburg,) joins the north fork, must, in the centre of the basin, be found even below the level of the town of Cumberland, and that it must be at least 1300 feet below the top of the central hill, still resting in the middle of the trough, near Hoyman's house. The old coal openings at the forks, are only three hundred feet above the mouth of Jenning's run; and as the latter point is known to be 684 feet above tide, we have at this point, a coal bed 984 feet above tide-water, capable of being mined by horizontal drifts, and presenting a breast of at least 4000 feet, on the slope of the Little Allegheny mountain, before it would reach the out crop, where it was observed near Beale's Gap.

MINERALS.

The mineral substances most abundantly distributed over the lands which I examined, are coal, iron-ore and limestone, with some fire clay.

By reference to the accompanying section, constructed in general from an actual, examination of the position of each bed, it will be observed, that about twelve different strata of coal have already been ascertained to exist; and that of these, not less than six or seven are susceptible of profitable working, and have actually been wrought on some limited scale, to supply the demands, either of the immediate neighbourhood, or of the public armory at Harper's Ferry. It is said to be not less than forty years since some of the lower beds began to be explored for these purposes; but from the limited demand for coal then existing, and the total absence of skill in mining among the inhabitants, together with the uncertain and hazardous mode of transportation by boats and arkso n the Potomac in time of floods, very little coal was ever taken out; and the various short drifts once opened, are now closed up, or so dilapidated as to be scarcely capable of examination. Several of these lower beds are from two to four feet in thickness. From the best information which I could collect, relative to the thickness of these, and from my own observations in the higher beds of the formation, I am led to the belief, that the total amount of workable coal in the formation, does not fall short of thirty feet.

Coal from four of the beds has been more particularly examined, but of all the portions formerly worked, good coal has been extracted, and its

general character among those who have used it, is a sufficient guarantee for the disposal of any quantity which could be brought to market on the sea-board.

ANALYSIS OF COALS.

No. 1. The first sample analyzed was from the eight feet bed, opened not far from H. Hoyman's place, at the centre of the trough, and near the highest part of the dividing ridge, between the waters of Jenning's and those of Gladden's run. This coal has a rather open structure, and jet black colour, or occasional iridescent tints, with portions of alternate bright and dull black surface. The surfaces of deposition are well marked, and the two sets of slines or cleats, are, in the sample before me, at angles of about 105° and 75°, with each other, giving a rhombic structure in that direction.

The specific gravity of this coal is 1.3432

Heated to 220° Fah. it loses	1.2	per ct.
When fully coked, it yields of water and other condensible matter,	4.0	"
And of uncondenscible gas,	16.8	"
It contains of earthy matter,	8.1	"
And of solid carbon,	69.9	"
	100.00	

The ashes are dense, of a reddish gray tint, and obviously contain a considerable proportion of oxide of iron, and probably a small per cent. of manganese; not enough, however, it is believed, to interfere, in the least, with the use of this coal for smelting iron.

No. 2. This specimen of coal was taken from the new opening on Uhl's upper vein, so called, some distance down the slope, below Hoyman's opening, on the big vein above alluded to. This bed is 84.14 feet below the preceding. Its thickness, measured at an old drift at some distance from the point where this new opening was made, was found to be 4 feet 9 inches, including a ply of slate of variable thickness, from 9 to 12 inches. The new opening had not, at the time of my visit, been so effectually opened as to enable me to determine exactly its thickness, but it is, doubtless, equal to that observed in the other opening.

The specific gravity of this coal is 1.3195

Heated to 220° Fah. it lost,	2.00	per ct.
And when fully coked it gave—		
in combined water and other condensible vapours,	1.4	"
And of uncondensible gas,	16.8	"
The earthy matter, bright buff or fawn-coloured ashes, is	4.05	"
Carbon,	75.75	"
	100.00	

The ashes are remarkably light, forming, in this respect, a singular contrast with those of No. 1.

No. 3. This sample was taken from an opening on the land of D. Korns, adjoining those of the company, on the north-east side of the dividing ridge, between the waters of Jenning's and Gladden's runs. The bed is 50.6 feet lower than the level of Beale's Gap, while the bed, called Uhl's upper vein, is opened on the other side of the ridge, at an elevation of 53.6 feet below the same gap. As far as exterior indications go, the identity of these two beds, appears to be established.

The coal from Korns's opening is of a cubical structure, colour deep black, lustre not remarkable.

Its specific gravity is 1.386

It loses by heating to 300°	1.4	per ct.
The volatile matter lost in coking is in addition,	18.7	"
The earthy matter is,	11.44	"
Carbon,	68.46	"
	100.00	

In coking, this coal swells but little, and the coke is dense, dark gray, and without lustre. The ashes are dense, inclining in colour to the fawn, but rather deeper, and might, perhaps, be described as between a fawn and a flesh colour.

No. 4. This sample was taken from an opening

recently made on the land of Schaeffer, adjoining the Weller tract of the company. The level of this opening is 485 feet below Beale's Gap, about 34 feet lower than the opening in Weller's field, and 63 feet higher than the opening on the "Meeting-house vein," from which it is distant one fourth of a mile, in a north-westerly direction. This opening appears to be a little to the north-west of the central line or synclinal axis of the trough, but cannot be far advanced towards the Savage mountain side of the basin. The coal is of good appearance, both in colour and texture. Its surface, shining, or covered with a slight film of oxide of iron.

Its specific gravity is 1.370

At 300° it loses of moisture	1.3	per ct.
By coking, it loses in addition, of bitumen,	17.5	"
The quantity of earthy matter is,	10.5	"
And the unvolatilizable carbon,	70.7	"
	100.00	

The ashes are dense, and of a chocolate brown colour, indicating a considerable quantity of metallic oxide. The coke is bulky, but of excellent appearance, having a steel gray lustrous exterior, but is porous internally.

No. 5. This coal is from Hoyman's eight feet bed, but a different ply from the sample given in

No. 1. The colour is nearly jet black, shining, structure rhomboidal, foleated, and occasionally exhibiting local contortions of the grain. The surfaces of superposition are strongly marked; and the main slines, or cleavages, are inclined to those surfaces, in an angle of about 30 and 150 degrees.

Its specific gravity is 1.363

At 300° it parts with moisture to the amount of	1.1	per ct.
And in coking loses in addition, of volatile matter,	17.2	"
It contains of earthy matter,	10.2	"
And of unvolatilizable carbon,	71.5	"
	100.00	

The ashes are of nearly as light a colour as those from hickory wood, but with a slight reddish tinge, are bulky, and appear to contain but little metallic oxide.

The coke is not voluminous, and has a steel-like colour and brightness. No sulphur was detected in the course of this analysis, though traces of sulphuret of iron do occur in some plies of this bed of coal.

No 6. This coal is from Hoyman's six-feet bed. The structure is rhomboidal, the colour of the surfaces of superposition, when developed, is a dead black, on the edges of the plies, shining and deep

black. The roof of the drift is 110 feet below the level of Beale's Gap.

The specific gravity of the coal is 1.362

At 300° it loses of moisture,	1.30	per ct.
By coking, it parts with an additional quantity of volatile matter equal to	18.5	"
It contains of earthy matter	11.66	"
And of unvolatilizable carbon,	68.54	"
	100.00	

The coke is of moderate density; the coal undergoes an enlargement in the process of coking, of 100 per cent. The ashes are moderately dense and coherent, of a reddish gray colour. Sulphur was distinctly perceptible in the analysis of this coal.

No. 7. This sample was taken from Uhl's seven feet vein, which, at the point of opening, is 130 feet below the level of Beale's Gap. The coal at this opening was observed to be much discoloured by oxide of iron, and as the specimen analyzed was from a part which had been exposed to the air, it had much of the oxide diffused over the surface, which would otherwise, probably, have exhibited the blueish black colour of the more solid parts of the bed.

The specific gravity of this coal is	1.388	
It lost at 300°	2.7	per ct.
And in addition, at a white heat	16.8	"
It contains of earthy matter	12.06	"
And of unvolatilizable carbon	68.44	"
	100.00	

The ashes are bulky, and of a purplish red colour. The process of coking enlarges the bulk of the coal, in some cases to three times its original amount, its exterior being covered with a red metallic oxide. This coal, like the preceding, gave, near the conclusion of the coking process, distinct evidence of sulphurous acid, resulting, no doubt, from the decomposition of the pyritous matter contained in it.

It will be observed that this coal agrees pretty nearly in character with No. 6, with which it may indeed be found to correspond in geological position.

No. 8, is a specimen from Weller's four feet vein; and the opening from which it was taken is 451 feet below the level of Beale's Gap, or 320 feet below that of the last mentioned bed. Between these two levels no beds are known to have been worked; though at least two separate beds have been traced; one at 196, and the other, of 274 feet below the level of Beale's Gap.

The coal from Weller's opening is of a deep

black colour, columnar structure, brilliant in its cross fracture, and of a dull black in the natural horizontal partings, unless where an efflorescense of sulphate of iron from decomposed pyrites, has given a white film to these surfaces.

This coal has a specific gravity of 1.321

It loses at 300°	1.4	per ct.
And by coking at a white heat, loses in addition	18.5	"
It contains of earthy matter and oxides	11.0	"
And of carbon not volatilized by heat alone	69.1	"
	100.00	

The ashes are of a blackish gray colour, with a faint trace of redness observable. The coke is rather more than double the bulk of the coal, is of a steel colour, and rather tender and friable in its consistency. Sulphurous acid is disengaged during the process; and a small quantity of peroxide of iron shows itself, resulting from the decomposition of the sulphate, or of the sulphuret of that metal.

The horizontal distance from this coal opening to that below the church is 1000 feet, and the descent in that distance is 96 feet; so that an inclined plane, with a slope of about one in ten, would convey this coal to a rail-road terminating near the Church land opening. It is probable that a location may be selected for such a plane, of

which the length would be one or two hundred feet less than that above stated.

No. 9. This coal is from the "Church land vein," so called, and is found at 548 feet below the level of Beale's Gap, and 557 feet above the mouth of Jenning's run. The same bed is open on the lands of the company, on the south side of the run, at a short distance lower down the stream.

This coal is of a columnar structure, has a deep black colour; the horizontal plies varying somewhat in brilliancy from each other. The surfaces of superposition are as in the preceding specimen, covered with effloresced sulphate of iron.

The specific gravity is 1.480.

Loss of moisture at 300°	1.2	per ct.
And of bitumen &c. by coking,	17.5	"
The amount of earthy matter is	12.74	"
That of the carbon	68.56	"
	100.00	

The ashes are dense, and of a reddish gray colour. The coke is about double the bulk of the coal from which it is obtained, has an iron gray or reddish exterior, and cakes sufficiently to render it compact.

No. 10. This is from Weller and Hardin's vein, opened on the George Weller tract, 1900

feet in a north-west direction from the Church land vein, near the point where a tributary comes into the north fork of Jenning's run. It is underlaid by a bed of limestone, several feet in thickness, over which that tributary descends for a considerable distance. The coal is of a columnar structure, dull black or iridescent colour, is rather tender and friable in texture, and has a specific gravity of 1.491.

Heated to 300° it loses	1.4	per ct.
Coked at a bright red heat it loses, in addition	16.2	"
It contains of earthy impurities	16.04	"
And of carbon	66.36	"
	100.00	

The ashes are dense and of a colour nearly flesh red. The coke exceeds the coal from which it is made, by about two-thirds of its original bulk. It has little tendency to cake, and becomes covered on the exterior with a coat of peroxide of iron, from the sulphate decomposed in the coking process. The quantity of earthy matter in this specimen is the greatest of all the samples tried, and the specific gravity, as will be perceived, is also the greatest; and indeed, if we arrange all the coals above reported, in the order of their specific gravities, it will be seen that the quantity of earthy matter in each follows very nearly the same order.

The following table exhibits the coals arranged in the order above suggested.

Coals arranged in the order of their specific gravities, with the proximate constituents of each.

No.	Locality.	Sp. Gr	Wat. expell. ed at 300°.	Bitumen	Ashes.	Carbon.	Pro. carb to 1 of bitumen.
2	Hoyman's New opening.	1.3195	2.0	18.2	4.05	75.75	4.162
8	Weller's four feet vein.	1.321	1.4	18.5	11.00	69.10	3.735
1	Hoyman's Old bed.	1.3432	1.2	20.6	8.10	69.90	3.393
6	Hoyman's 6 feet bed.	1.362	1.3	18.5	11.66	68.54	3.705
5	Hoyman's 8 feet bed.	1.363	1.1	17.2	10.20	71.50	4.157
4	Schaeffer's new opening.	1.370	1.3	17.5	10.50	70.70	4.040
3	D. Korns's old opening.	1.386	1.4	18.7	11.44	68.46	3.661
7	Uhl's seven-feet vein.	1.388	2.7	16.8	12.06	68.44	4.073
9	Meeting-house vein.	1.480	1.2	17.5	12.79	68.56	3.918
10	Weller and Hardin's.	1.491	1.4	16.2	16.04	66.36	4.096
	Mean results.	1.382	1.5	17.97	10.68	69.73	3.894

Omitting the minor fractional divisions, it may be stated that the coal of this formation, contains in 100 parts, by weight, one and a half parts of hygrometric moisture, eighteen of bitumen, ten and

a half earthy matter, and seventy of carbon. It may also be stated in general terms, that the volatile combustible matter bears to the carbon, the proportion of one to four.

The mean specific gravity of the coal being 1.382, the weight of one cubic yard will be 2747 pounds; and each acre of land on which the eight feet bed is found, will accordingly, contain in that bed, 15,800 tons. The six feet bed will contain nearly 11,800 tons per acre.

IRON ORES.

The variety of iron ores found on the property of the company, their abundance and richness, warrant the highest expectations, as to the value of this district, for iron manufactures. They all belong, in their original condition, to the class of argillaceous carbonates; and though, when observed on or near the surface, they have often been changed to brown hydrates, yet the former is the character under which they must be viewed, when contemplating their application to practical purposes on a large scale. The situations of the several beds of iron ore are various; some being found near the highest part of the formation, as exemplified in the hill north of Henry Heiman's house, and only sixty feet in vertical distance below its summit; others lie below all the beds of coal, and are hitherto

only traced along the outer edges of the trough, near the summits of the Savage and Little Allegheny mountains.

The first iron ore which we encounter in approaching the Savage mountain coal-trough from the south-east, is the fossiliferous ore belonging several hundred feet below the lowest coal. It appears to be analogous to that which is found in various situations from the North and West Branches of the Susquehanna, to the southern borders of the state, near which, I observed it in ascending Gladden's run. It is nowhere in this vicinity explored, that I am aware of, for economical purposes. I had but few opportunities of seeing the ore itself, but the accompanying rocks are so well marked that there is no doubt in my mind that the samples which fell under my notice, are truly portions of the same, or a similar formation.

The next ore in the order of the geological strata, appears to be that which lies almost immediately beneath the conglomerate rock, constituting the general boundary of the coal measures. This ore is exposed near the north branch of Jenning's run, where it passes through Reiber's Gap, and direetly in sight of the Somerset turnpike, where the latter crosses the Savage mountain. In the centre of the basin this member of the series must be many hundred feet below the lowest depression of the surface. I am not aware that it

has yet been explored on the Little Allegheny mountain, though I see no reason to doubt that its equivalent at least, will be there found. Reiber has explored two or three bands of ore, each from five to six inches thick, and within six or eight feet of each other. The inclination of the strata here, is 20° towards S. 45° E., and consequently, the strike of the measures conforms to what has been above assigned as the general direction of the trough. This ore has been designated in the series of analysis, as

No. 1. It is very compact in structure, of a bluish grey colour, gives a splintery fracture, and sometimes developes in its surfaces of separation, the existence of vegetable fossils.

Its specific gravity is 3.7644.

At a temperature of 320° Fah. it loses	1.	per ct.
When strongly calcined, it loses in addition	28.4	"
And yields of pig metal	42.2	"
Earthy matter and oxygen	28.4	"
	100.	

The iron obtained in this assay was grey, soft, and tough. The mining of this ore would probably be found expensive, at least in the locality above described; but if discovered on the south-eastern side of the trough, the approach to it

would be more convenient, and the mining less expensive.

No. 2. Next in the order of superposition, appears to be the 6½ feet bed of iron ore, in bands and balls, as found near the top of Savage mountain. The sample analyzed was taken from near the bottom of the bed, out of a compact *band* of ore, 12 inches thick. The dip of this bed is, S. 50° E. 17°.

This ore is a light blue impure carbonate, inclining in some parts to reddish brown, owing, probably, to the formation of some peroxide, by exposure to the atmosphere. Its fracture is rough and splintery.

Its specific gravity at 63° Fah. is 3.3957.

Heated to 350° it loses	0.5	per ct.
When calcined at a white heat, it loses in addition,	28.0	"
It yields of pig iron,	39.2	"
And contains of earthy impurities,	24.1	"
And of oxygen,	8.2	"
	100.	

The pig metal yielded by this ore is dark grey, soft, tough, and exhibits various dark crystalline facets.

The cinder is brittle, opake, whitish, and abounds in cavities.

No. 3. The next sample of ore analyzed was

from the same bed as the preceding, but was taken from the upper ply or band which is continuous, and about seven inches thick. The fracture of this ore is uneven or splintery; its colour is ashen grey, with brownish red spots near the exterior.

Its specific gravity is 3.077.

Heated to 320° it loses of moisture,	00.5	per ct.
Calcined to whiteness for some time it parts with water and carbonic acid to the amount of	20.6	"
It yields of pig metal,	32.8	"
And gives of earthy matter,	37.	"
Of oxygen,	9.1	"
	100.00	

The pig metal obtained from this ore is light grey, moderately hard, but tough. The ore will be fully reduced by a flux, consisting of 10 per cent. of its weight of limestone. The cinder is lightish green, and of uniform texture, indicating complete fusion among the earthy ingredients.

No. 4. This was another sample of band ore taken from the mouth of a pit sunk on the bed above described, on the Savage mountain, and presumed to have come from the lower ply, the same as No. 2.

Its fracture is uneven, colour reddish grey internally and brown externally.

Its specific gravity is 3.3179.

Heated to 320° it loses	0.6	per ct.
It loses in addition, by calcination at white heat,	24.4	"
And yields of pig metal	36.1	"
Earthy matter,	33.8	"
Volatile matter,	5.1	"
	100.00	

The pig metal of this sample was white and brittle. The cinder, yellowish brown, semi-transparent.

No. 5. This specimen is from the new opening on the Weller tract. Its thickness was not accurately ascertained, as the pit was filled with water at the period of my visit.

Its colour is dark grey, fracture moderately smooth, the decomposed exterior has a coat of ashey grey argillaceous matter.

Its specific gravity is 3.2646.

At 300° it loses in moisture,	0.5	per ct.
At a white heat it sustains an additional loss of	29.5	"
It yields of pig metal	32.3	"
" of earthy matter,	31.1	"
" of oxygen and other volatile matter,	6.4	"
	99.8	

The iron yielded in this analysis, was dark grey, soft, and granular; the cinder whitish, and not very smooth or compact.

The elevation of the bed from which the above sample was taken, is about 475 feet below that of Beale's Gap, and 527 below the level of the summit of Hoyman's hill, at the cross-roads. It therefore underlies nearly the whole extent of the company's property, and is everywhere above the water-level of Jenning's run. It appears to be about 20 feet above the level of the *Church-land vein* of coal.

No. 6. This specimen was from the coal opening on the Uhl tract, known as Uhl's upper vein. It lies 44 feet below the level of Beale's Gap, and consequently 421 feet above the last mentiontioned locality.

The ore has a deep chocolate brown colour, yellow without; it is of a compact texture, but contains occasional cavities, filled with argillaceous matter.

Its specific gravity is 3.4704.

Heated to 320° it loses	4.3	per ct.
At a white heat it loses in addition,	11.5	"
It contains of iron	58.94	"
" oxygen	25.26	"
	100.00	

The ore is reduced at once to metallic malleable iron on the exterior, when in contact with charcoal, at the reducing temperature; and this outer shell contains magnetic oxide of iron, apparently nearly pure.

It seems probable that it would be most advantageously worked with an argillaceous or calcareous ore, containing a larger portion of earthy matter.

This ore is a hydrated peroxide of iron, and is evidently the shell derived from the decomposition of carbonated argillaceous ball ore.

No. 7. This was a sample of the ore from the farm of Cook, senior, found about one mile north or north-easterly from Hoyman's place. It is compact in structure, grey or bluish grey colour, gives a somewhat conchoidal fracture, and has a specific gravity of 3.2764 at 52° Fah.

When heated to 320° it loses	0.5	per ct.
And when calcined to whiteness, loses in addition,	30.5	"
It yields of pig metal,	26.7	"
And contains of earthy matter,	29.5	"
" oxygen	12.8	"
	100.	

The reduction is performed with some difficulty, and it is probable that a portion of the oxide escaped decomposition, and passed off with the

cinder. The latter is of a blueish black colour. The thickness of the bed from which this ore was taken, has not hitherto been ascertained, but from my observations I conceive that more than one bed of ore, capable of being profitably worked, may be found on the northerly side of the ridge, between Jenning's and Gladden's runs, on the waters of which latter stream, the farm above mentioned is situated. The iron is dark grey and crystalline.

No. 8. Above the eight feet bed of coal on the Hoyman place, and between it and the upper three feet bed, is a band of iron ore, at an elevation 29 feet above the level of Beale's Gap, and 75 feet above the level of the old drift near which stands the log-cabin occupied by Miller.

This ore is found in a seam of variable thickness, from six inches to one foot, and the outcrop presents some well preserved samples of carbonate, not deeply affected by the atmosphere, but exhibiting merely a thin coating of hydrate.

Its specific gravity at 52° is 3.4069.

It loses at 320°	0.5	per ct.
And at a white heat,	28.4	"
It yields of iron,	35.2	"
Of earthy matter,	28.2	"
Of oxygen,	7.7	"
	100.00	

The iron is a soft mottled grey, fine grained, and tolerably tough. The cinder is easily separated from the metal, and shows internally a dirty green colour.

Tabular view of the iron ores above described.

No.	Locality.	Sp. Gr	Wat. expell. ed at 300°.	Loss by calcin- ation.	Yield in pig metal.	Earthy matter, &c.	Oxy- gen.	Remarks.
1	Reiber's Gap, Savage mount'n.	3.7644	0.1	28.4	42.2	28.4	8.	Iron, grey, soft, tough.
2	Cath. Wyman tract, Sav. mount	3.3057	0.5	28.	39.2	24.1	8.2	Iron, dark grey, soft, tough and crystalline.
3	Upper part of same bed.	3.077	0.5	20.6	32.8	37.	9.1	Iron, light grey, moderately hard, but tough.
4	From same tract, but dif. opening.	3.3179	0.6	24.4	36.1	33.8	5.1	Iron, white and brittle.
5	Weller tract new opening.	3.2646	0.5	29.5	32.3	31.1	6.4	Iron, dark grey, soft, granular.
6	Uhl's upper vein.	3.4704	4.3	11.5	58.94		25.26	Iron, malleable.
7	Cook's farm.	3.2764	0.5	30.5	26.7	29.5	12.8	Iron, dark grey, crystalline.
8	Hoyman's Hill.	3.4069	0.5	28.4	35.2	28.2	7.7	Iron, mottled, fine-grained, tough.
	Mean	3.3716		25.16	37.93	30.3		

From the mean specific gravity of these ores, it appears that one cubic yard will weigh 5685 lbs. or a little more than two and a half tons. It also appears that the average yield in pig metal is a trifle short of 38 per cent. In practice it will probably be safe to calculate on taking three tons of these ores to make one ton of pig iron.

In numbers 1, 2, 4, 5, 7, and 8 of the assays, it is manifest that the iron was almost wholly in the state of a carbonate of the protoxide, since the mean amount of carbonic acid in those six samples was 28.2 per cent., from which the calculated quantity of iron, supposing it to have been protocarbonate, would be 35.69 per cent.; whereas, it was by experiment, 35.28. The slight deficiency is accounted for, in describing the results of the seventh analysis.

It will be observed that only one of the specimens yielded a white and brittle metal. Indeed, out of many series of assays which I have made on the iron ores from various localities, I do not recollect to have met with a more satisfactory set of results, from any of the carbonated ores of our coal formations.

The valuable bed of ore on the south-easterly slope of the Savage mountain, opened on the Wyman tract, and exhibited in Nos. 2, 3, and 4, of the preceding table, will doubtless be found to extend the whole length of the Adams and Combs tracts, or for a distance of at least two and a

half miles, and with a breadth of more than half a mile. The openings on this ore are at present formed by shafts or pits, sunk to a depth of about 25 or 30 feet. As all the strata here dip in a south-eastwardly direction, and in angles from 16 to 18 degrees, it would not be difficult to approach this important ore bed, by tunnelling across the measures, from a point at some distance below the present opening, and having reached the bed at the lowest convenient level, to run horizontal drifts along the bed, in N. E. and S. W. directions, from which breasts would be worked, upward, north-westwardly, to the outcrop, a distance, probably, of not less than 1000 feet. A tunnel, such as I have just indicated, would cross all the measures between its opening and the ore bed, and would consequently lay open several of those beds of coal which belong to the lower members of the series, not elsewhere approachable on the company's property.

LIMESTONES.

The possession of an abundant supply of limestone, interstratified with the coal and iron ore beds of the Savage mountain coal-trough, is a circumstance of great interest, in relation, particularly, to the manufacture of iron. These beds are

found at different elevations, and the materials they contain are of variable qualities.

The highest bed of limestone is found on the land of D. Korn, on a tributary of Gladden's run, and at a level of 206 feet lower than that of Beale's Gap. It is particularly noticed at No. 1 of the following table. The thickness of the bed is not well ascertained; and it is not known that the same or an equivalent bed has yet been noticed on the south-easterly side of the ridge. It should be sought for near the level of the coal opening, made in the woods, by order of the president of the company, on the Hoyman tract, and at the left of the road in ascending. It yielded to analysis 38.5 per cent. of pure lime, equivalent to 68.22 of carbonate of lime.

The next limestone of consequence which has been disclosed in the descending order of stratification, is met with at an elevation 327 feet less than that of Beale's Gap. It presents itself near the house of Daniel Uhl, where the outcrop is readily traced.

The colour of this limestone is variable, a part of the bed being ferruginous, and a part nearly destitute of the oxide of iron, as indicated in the analysis presented at Nos. 2 and 3 of the table.

The next lower bed is found on the Weller tract, 490 feet below the level of Beale's Gap, and the quality of the stone is indicated at No. 4 of

the table. This stone appears likely to furnish a suitable flux for some of the ores of iron; though at the temperature of smelting iron, it was not found to be fusible *per se*.

The 5th and 6th samples of the table are from a bed on the north fork of Jenning's run, which, in one place has a thickness of 15 feet; the elevation not precisely ascertained, but supposed to be geologically lower than any of the preceding. The bed is of variable qualities as indicated by the analysis, and also by the exterior characters of the stone. A part would probably be found highly useful for making lime; and the whole may, when properly quarried, furnish a good building stone.

Of the two remaining limestones, (Nos. 7 and 8,) both are found on the south-eastern side of the trough; the one at an elevation of about 160, and the other, 340 feet below Beale's Gap. The latter of these beds is about nine feet in thickness, and the distance and inclination of the strata, lead to the supposition that it may be the same as is found in Weller's field, (No. 4.) particularly as it is known to be overlaid by a bed of coal, at about the same distance as in the last mentioned locality. The higher of these beds may possibly be the same as that opened on Korn's land, the difference in elevation being attributable to the slope of the measures.

The much greater proportion of insoluble earthy

matter, together with a large dose of metallic oxides renders this latter limestone unsuitable for the ordinary purposes to which lime is applied, and yet may not interfere essentially with its employment as a flux, especially as it is found to yield to heat, even when treated by itself, at a temperature, certainly less than that which is ordinarily required for reducing the ores of iron.

The limestone found at the "Big Spring," in a bed nine feet in thickness, (not included in the following table,) on the Hoyman tract, has a specific gravity of 2.709, yields excellent lime of a yellowish white colour, and by calcination loses 36.4 per cent. of its weight. It shows in many respects a strong analogy with the limestone found on the Weller tract. After calcination, this limestone is completely soluble in acids.

Tabular View of the Series of Limestone examined, with their localities and characters.

No.	Locality.	Description.	Specific gravity.	Wat. lost at 212°	Wat. & car. acid exp. by calcina.	Lime.	Insoluble argiliac's matter	Metal. ox. dissolved.	Soluble argillaceous matter.	Remarks.
							Per ct.			
1	Korns's op. on a br. of Gl. run, bel. a coal se'm	Colour, dark grey, structure, moderately compact, fracture, uneven.	2.6752	0.4	35.0	38.5	12.0	4.0	10.1	The insoluble residuum of this assay, was of an ashen grey colour, and of a harsh, gritty feel.
2	Ferrug. limestone, near Uhl's house.	Colour, internally dark grey, externally, reddish brown, structure, compact, fracture, uneven, splintery.	2.7654	0.2	39.4	28.5	8.5	6.0	17.4	Fully calcined, this stone slakes into a rather crude lime, of a grey colour, indicative of the considerable amount of oxides of iron and manganese.
3	Near Uhl's house, non-ferrugin. portion.	Colour dark ashen grey, with white streaks, structure compact, fracture splintery.	2.7194	0.3	42.5	41.0	3.0	3.0	10.2	This limestone turns, by calcination, into a very good yellowish grey lime, and would probably answer all the purposes of building and iron manufacture.
4	Weller's field, N. E. of turnpike.	Colour dark grey, structure compact, fracture conchoidal uneven.	2.7028	0.3	42.0	41.50	5.5	7.5	3.2	This limestone, when fully calcined, slakes into a grey lime, well adapted to the purposes of building and of agriculture.
5	N. Fork Jenning's run, 15 feet bed.	Colour yellowish grey, structure partly crystaline, fracture splintery.	2.7593	0.3	36.8	19.5	15.5	7.5	20.4	The insoluble residuum is a greyish white argillaceous compound. This stone may be fused by itself at a heat lower than that for smelting iron.
6	Hardin's old coal-bed.	Colour reddish grey, structure amorphous, fracture splintery, conchoidal.	2.7162	0.5	34.74	35.	24.5	1.5	3.76	Insoluble residuum, a white clay. This stone furnishes, after calcination, a grey lime of lighter colour than any of the preceding, and might probably be found useful in building.
7	Point Hill, in Hoym. woods, S. of his lower coal opening.	The structure of this limestone as well as its colour and fracture, strongly resemble the preceding.	2.0818	0.6	31.4	19.	17.	11.5	21.1	This lime slakes but very imperfectly, and would therefore be less suited to the purposes of the arts and of agriculture, than most of the preceding.
8	Spring-house on Hoyman's tract.	Colour dark grey, inclining to black, structure compact, fracture splintery.	2.7577	0.5	36.	30.	13.	8.	12.5	The residuum undissolved, is a greyish white powder, slightly coherent.

Having described the various minerals which appeared most worthy of notice, in consideration of their immediate usefulness, I may add that a series of ancient coal-drifts is seen on the right of Jenning's run, 648 feet below Beale's Gap; and a bed of iron ore is found on the left bank of the same run, below the house of P. Wilhelm, seven hundred and thirteen feet below that level. These must underlie the whole of the company's property, on the north-east side of Jenning's run. Again, at 723 feet below our general level, is a coal opening, between the houses of Miller and Culp, on the right of the run, descending; and at a distance of a few hundred yards above Bluebaugh's house, at the junction of the two forks of Jenning's run, are two lines of old coal workings, 300 yards apart—one on the left, and the other on the right of the run,—and both so near the same level, as to lead to the presumption, that they belong to one and the same bed. They are respectively 808 and 810 feet below our line of departure, and appear to repose almost directly, on the conglomerate bed of the coal formation. The direction from one set of these openings to the other, is almost exactly that which has been assumed as the general longitudinal direction of the coal-trough.

CONNECTION WITH THE PUBLIC WORKS.

THERE are two methods by which the property of the company may be connected with the Chesapeake and Ohio Canal, and with the Baltimore and Ohio Rail-road. The former of these works, will, it is understood, be shortly connected with the mouth of Jenning's run, at which point, a basin is to be constructed; and the latter has been located, from Cumberland, along the valley of Will's creek, around the north-eastern extremity of the Savage mountain coal-trough, and of course passes by the same point.

By inspecting the map herewith submitted, it will be seen that the mouth of Jenning's run is but two and one seventh miles, in horizontal distance, from Beale's Gap, the commencement of my line of survey across the trough; and the profile and section, also accompanying this report, will show that the said gap is 1117.4 feet above the water-level at the mouth of that run. Deducting 17.4 feet for the elevation at which a rail-road might terminate, above water-level in the basin, we should have 1100 feet as the height to be overcome—or rather of descent to be effected—in the distance above mentioned.

Nearly the whole of this distance might be traversed on self-acting inclined planes; and would, consequently, enable the company to take advantage of the natural force of gravitation, for

transporting all their materials thus far on their way to a market.

In running from Beale's Gap to the mouth of Jenning's run, the line of planes would lie wholly within the state of Maryland; but in reaching Will's creek, *within the borders of Pennsylvania*, the direct horizontal distance would be only $1\frac{3}{4}$ miles; but the distance above the mouth of the run, where the state line crosses Will's creek, is about $2\frac{1}{4}$ miles:—so that on the whole the most advantageous route to be pursued in locating planes, would probably be that which lies on the Maryland side of the line.

I have spoken of one mode of approach to the coal field. By an examination of the accompanying geological sections, it will be observed that the level attained by planes such as have been contemplated, is considerably lower than that of many parts of the formation in the cross ridge, between the waters of Jenning's and those of Gladden's run. But a large portion of the formation would still lie many hundred feet below the level in question, and would consequently be unapproached by the method above alluded to.

The most direct course to reach the *whole* of the series of measures, including iron ores, coals and limestones, would doubtless be a tunnel through the Little Allegheny mountain, striking the lower bed of coal, a little above the level of the mouth of Jenning's run. This method of approach,

though, perhaps, too bold and expensive an undertaking for this country and for the present century, would be far less formidable than many works executed for similar purposes, in other countries. It would, either by the direct, or by lateral cuttings, certainly reveal every portion of the strata, and would give advantages to the property on which it should be constructed, which are believed not to be enjoyed on any natural channel by which the minerals of this coal-trough can be reached. But the want of surplus capital in this country may, perhaps, operate for a long time yet to come, in compelling us to resort to cheaper expedients for temporary purposes. The natural channels, formed by the water-courses, must therefore be resorted to, in which to locate rail-roads, for approaching, at least a part, of the minerals of our coal-fields. In examining the two streams which alone are available for these purposes to the Allegheny Coal Company, namely, the Jenning's and the Gladden's runs, I have preferred the former, both on account of its affording the more direct and easy approach, and also, because, if a rail-road be constructed along the Jenning's run, to the forks, and thence up its north branch to the lands of the company, the lower section of 3¼ miles, or more than half of the whole distance, would be equally useful for any parties who should be engaged in transporting minerals from the south

fork of the run, which has its sources near Frostburg.

RAIL-ROAD.

With the above view of the advantage of an approach through the valley of Jenning's run, I caused a survey and levelling to be made from the lands of the company near Wellersburg, to the mouth of that stream, and found the distance to be 5.8 miles, and the total descent from the level of the Church land vein, so called, to that of the mouth of the run, 560 feet. The whole is divided into sections on the accompanying profile, from which the distances and grade per mile for each section may readily be perceived. It is evident that no power except that of gravitation will be required by the descending loaded trains on any part of the road, and the service of engines will only be needed to draw back the empty cars. It will be perceived, on inspecting the section that the Church land vein, with four or five other workable beds of coal, and with much iron ore and limestone, is wholly above the level of the terminus proposed for the road. No actual location of the rail-road was of course made. All the surveys were intended to be preliminary to more minute investigations hereafter. No curve of a less radius than 1000 feet would probably be required.

COST OF TRANSPORTATION TO MARKET.

ADMITTING that twenty-eight bushels of the coal found on the company's lands make one ton, we shall be able to compute the expense of it at tide-water, by assuming that the actual cost of mining and delivering on the rail-road, is 70 cents per ton, a very large estimate, sufficient to cover the expense of opening, propping, &c., this will be, per bushel, 2.5 cts.

Transportation on the company's rail-road, $5\frac{1}{2}$ miles, to the mouth of Jenning's run, at $3\frac{3}{4}$ cents per ton per mile, say $\frac{3}{4}$ cent per bushel for the whole distance,	.75
Wastage and incidental expenses,	.25
Transportation in canal-boats from the mouth of Jenning's run to tide, 189 miles, at $1\frac{1}{2}$ cents per ton per mile, (the expense on the Pennsylvania canals,)	10.1
Makes the whole expense of the coal at tide, 13.6 cts. per bushel=*three dollars and eighty-one cents per ton.*	

The above computations are founded on business transactions in other coal regions, and on the known rates of toll and transport on canals and rail-roads, which have yielded ample profits to the proprietors. The Chesapeake and Ohio Canal has locks 100 feet long and 15 wide, which, as the canal has a depth of 6 feet, will, doubtless, take

boats of at least 100 tons burthen. By a reference to some citations in the Appendix to this report, it will be seen that others have estimated the cost of coal taken at points more remote from Cumberland than are the mines of the Allegheny Coal Company, at somewhat less than I have given it above, but in order to be within limits entirely safe, I have chosen to place the expense fully up to the known practical limits, or even to set some of the items a little above what may be done elsewhere, in order to meet any contingencies which might occur in commencing a new branch of trade in a new locality.

For the last two or three years, bituminous coal has been sold in most of our Atlantic cities, at from seven to eight dollars per ton.—Suppose this to be reduced to six dollars, when the American bituminous coals come into market, this will still leave $2 19 per ton to pay freight coastwise, and yield the profits of the company:—and supposing present prices to be sustained, there would be left $3 19, applicable to the same objects. Admitting that the freight from Georgetown to Baltimore, Philadelphia, New York and Boston, should, on an average, be $1 50 per ton, there would, at the low rate at which I have stated the probable price of coal, be still left 69 cents per ton, as the *value in the ground*, of every ton of coal which could be taken out and brought to market from the company's lands. At this rate, an acre of the eight

feet bed, would alone, after deducting one-seventh for pillars and gangways, be worth $9,344.67; and as this bed contains but about one-third of all the workable coal above water-level in the centre of the basin, the total value of an acre, without including the lower beds, may be fairly set down at 28,000 dollars.

Though the above computation is founded on a supposed reduction in the price of bituminous coal to six dollars per ton, yet I know of no reason to expect that it will, for many years to come, be reduced to that price. The present price of Virginia coal in the Philadelphia market, is from $6.75 to 7 dollars per ton, by the cargo.

The adaptation of the situation to the manufacture of iron, appears to be complete. The ore itself is very abundant, and of excellent qualities. The coal is of the class known as "dry bituminous," yielding a moderate per centage only of volatile matter, and a coke which is not so bulky as to choke the furnace, or prevent the application of the raw coal to the manufacture of iron, even without the labour and expense of coking. This remark is not hazarded as a mere conjecture. The coal of this basin, has, within a distance of ten or twelve miles of the company's property, been actually applied to the manufacture of iron, both with and without the process of coking. Having visited the works at Lonakoning, I can bear testimony to the fact, that iron of excellent quality

was made from the ore, coal and limestone found on George's creek, and having before me samples of all the materials used at that locality, I can discover no superiority in them, over those found on the property of the Allegheny Coal Company. To leave no doubt on this subject, particularly with regard to the coal, I analyzed a sample taken from the thick bed, worked near the furnace at Lonakoning, and found it constituted as follows:

Its specific gravity is 1.346.

It contains of moisture and bitumen,	16.03	per ct.
" of earthy matter,	13.22	"
" carbon,	70.75	"
	100.00	

It produces a coke rather more bulky than that of the majority of coals above described. The ashes are nearly of the colour of those of the coal from Hoyman's opening, on the large bed.

To assure myself of the comparative value of coal from an intermediate point, between Lonakoning and the lands of the company, I examined that found at the Eckert mine of the Maryland Mining Company, which gave the following results, viz:

Its specific gravity is 1.437.

It contains of volatile matter,	15.62	per ct.
" earthy matter,	15.82	"
" carbon,	68.56	"
	100.00	

These analyses were made with all the care necessary to insure accurate results. Both these

coals are evidently of the same family, and both are intimately related to those above described. The higher specific gravity of the Eckert mine coal, had, in conformity with a preceding statement, led to the supposition of its containing more earthy matter than that of Lonakoning;—a conjecture fully borne out by the experiment. The iron ore used at Lonakoning, yields, in actual operations, 33 per cent., or a little less, of pig metal. The limestone used is nearly black, and apparently much inferior to that found on the Jenning's run, particularly the nine feet bed found on the Hoyman tract.

The more favourable situation of the lands of the Allegheny Coal Company in regard to transportation, than those in the south-western end of the coal-trough, has already been referred to; and when we take into view the richness and abundance of iron ores, there can hardly be a doubt that the manufacture of iron can be carried on in the Pennsylvania portion of the basin, with at least as much profit as in any other part of this coal field.

Besides the minerals already enumerated, beds of valuable building materials, and seams of fire clay occur at various levels in this coal basin; and owing to the due admixture of lime in the formation, the land is in many parts excellent for agricultural purposes.

I remain, gentlemen, very respectfully,

Your obedient servant,

WALTER R. JOHNSON.

Philadelphia, Feb. 16, 1841.

APPENDIX.

(A.)

Extract from a Report on the New Map of Maryland, 1836, *by Professor J. T. Ducatel.*

Viewed transversely, this coal field presents a succession of strata, disposed in a moderate curve, and filling up the valley between the Savage mountain and Dan's mountain, its whole depth being computed at fifteen hundred feet. The inferior strata that are continuous, most probably basset out toward both extremities at a considerable elevation, in the mountains forming the lateral limits of the basin, where they are covered unconformably by strata of millstone grit. The surface of the deposite is irregular, the ravines of the water-courses having penetrated into it to great depths. George's creek, in a distance of thirteen miles and in a longitudinal direction, has scooped out its bed through twelve hundred and fifty feet of perpendicular elevation, carrying away part of the six foot stratum previously mentioned as occurring six hundred feet below the fourteen feet bed, and sinking beneath it to the depth of 220 feet. On the other hand, Jenning's run, in the short distance of six miles, in a direct line, cuts both longitudinally and transversely, through the whole formation, exposing the subjacent red sand-stone. Similar lacerations of the deposite have been produced by the lateral streams, which at some periods of the year act with all the impetuosity of torrents. Moreover, the original irregularities of the surface, that have since determined the direction of the water-courses, as they now appear, were doubtless produced by some more general and powerful excavating cause, that has removed perhaps more than two-thirds of the whole mass, as it existed at its first deposition. That the present irregularities of hill and dale have been occasioned by the partial destruction of the uppermost strata, is made obvious by the fact that the irregularities of the surface do not affect the dip or inclination of those that remain. When they are cut off by the intervention

of a valley, they will be found on the sides of the opposite hills at the some relative levels; showing that the beds had once been continuous. It is important to attend to the extent and direction in which these causes of dispersion in the uppermost strata have acted; because a satisfactory reason is thus obtained for the total disappearance of valuable beds in an intervening place between no very distant spots. The same causes, however, furnish facilities for the exploration of strata that could not otherwise be reached, except at the labour and expense of deep mining operations.

It is worthy of remark, that in the whole of this coal formation, equal in extent to that which has been styled 'the great coal-field of Northumberland and Durham, in England,' there is no reason to expect the occurrence of any *faults*, or dislocations of the strata. These *faults*, so termed, probably from their baffling for a time the pursuit of the miner, consist of deep vertical fissures, usually filled by clay, and including fragments disrupted from the contiguous beds. They are accompanied by a subsidence of the strata on one side, or an elevation of them on the other; so that the same strata are found at different levels on the opposite sides. The change of level occasioned by these dislocations, sometimes exceeds five hundred feet; whence may be inferred the immense violence of the convulsion that had power to produce the displacement of such large masses to so great an extent. It is evident that the absence of such irregularities is a favourable circumstance for the mining operations that will, doubtless before long, be carried on upon an extensive scale, in the Frostburg coal-field.

(B.)

Extract from the Annual Report of the Geologist of Maryland, 1839. *By Professor J. T. Ducatel.*

The extensive operations that have been carried on at the Lonakoning Iron Works, in Allegheny county, can leave no doubt now that that region of country is abundantly supplied with iron ore, easily obtained, and yielding a very superior metal. Specimens of the pig-iron obtained from this establishment have been forwarded to Baltimore, where they have been already tried with complete success, in various ways, and

the iron left with one of our most ingenious engineers and intelligent artists, (Mr. Winans,) to be subjected to further experiments that cannot fail to establish a character of great excellence to it. Whatever doubts have been expressed, as to the quantity and quality of the ore, have been hastily and indiscreetly, to say the least of them, entertained.

(C.)

Extract from the Third Annual Report on the Geological Survey of the state of Pennsylvania. By H. D. Rogers, State Geologist.

This basin commencing towards the head of Stone run, in Hardy county, Virginia, ranging through Maryland, and terminating at Will's creek, in our own state, is here bounded on the east by the Little Allegheny, and on the south-west [north-west] by the Savage mountain. The Pennsylvanian portion of this basin may be estimated at five miles in width, measured along the State line, and seven in length. It is believed that no coal will be discovered to the north-east of Will's creek, from the close approximation of the bounding ridges, the coal measures have there been much exposed to denudation and carried off. Of the coal veins enclosed within this trough, the highest in the series is that which is principally worked. It extends with a very undulating line of outcrop near the summit of a long irregular ridge of considerable elevation, lying about midway between the Little Allegheny and Savage mountains. Numerous transverse valleys of denudation intersecting the ridge, have interrupted the regular range of this upper coal seam, rendering it difficult to compute the area which it actually occupies, but favouring greatly the operations of the miner, to penetrate it by exposing a more extensive outcrop. Its average thickness, as ascertained in numerous places where it has been opened, is about eight feet, the most extensive mine being that of David [Henry] Hoyman, about a mile north-east of Jenning's run.

The identity of this, with the great seam worked at Frostburg, in Maryland, is highly probable, as well from the character of the coal itself, and the accompanying shales, as from the similarity of its position on the ridge. Several other

good seams are known, situated lower in the series, in thickness from three to five feet, but being less accessible and important than the one above, and there being at present but a small demand for coal in this neighbourhood, except for local use, they have excited but little attention. Iron ore of excellent quality was collected by us on the surface, at many points in the basin, and there is reason to believe will be found in ample quantities especially associated with the shales of the lower seams, whenever the proprietors of the soil shall deem it of sufficient consequence to undertake the requisitie diggings. Between the coal seams there occur two or more thin bands of limestone sufficiently abundant to use as a flux or for agricultural purposes.

(D.)

Extract from "A History of the Lehigh Coal and Navigation Company," published by order of the Board of Managers, 1840, *p.* 50.

The present cost of transportation of coal on the Lehigh and Delaware Canals, including tolls, is one cent, and six-tenths of a cent per ton per mile; and, with a little improvement in the Delaware Canal, this cost can be reduced to one cent, and four-tenths of a cent per ton per mile: more than half of this is tolls or profit to the canals. For this price contracts can be made with boatmen, who furnish one or more boats, as required, with their own crews, horses, &c. These boats, by being decked, would be capable of proceeding to ports on the North or East rivers without transhipment.

(E.)

Extracts from a Report on the probable Revenue of the Chesapeake and Ohio Canal, made to the Baltimore Convention, December, 1834, *signed A. Stewart, Chairman, p.* 48.

The Committee lay down this position with perfect confidence, *that bituminous coal of superior quality can be delivered on tide-water, for a less sum by this canal, than it can be deliv-*

ered at any other port, on tide-water, in the United States. And if this be true, it follows, as a matter of course, that there will be no limit to the demand, for exportation, but the capacity of the canal to deliver it.

It is a well known fact, that, on the Monongahela river, coal excavated from similar mines, is now delivered at thirteen steam mills and factories, at one cent per bushel. It is presumed it will not cost more, under similar circumstances, to deliver it in a coal boat on the Potomac; but let this sum be doubled, and say that coal in boats will cost two cents — 2 cts. per b.

Tolls. The tolls charged on the Pennsylvania Canal for transportation of coal, is half a cent a ton per mile, which, at 28 bushels per ton, will be nearly — 4 cts. per b.

Freight. A boat carrying 1,680 bushels, travelling 2 miles per hour, or 48 miles in 24 hours, (less than the usual speed), will reach tide in $4\frac{1}{2}$ days; it will require, say 2 men, $2, a boy and horse 75 cents each, making $3 50 per day, or $15 75 for the trip, equal to nearly — 1 ct. per b.

It is presumed that the returning freight from Washington and the Baltimore rail-road will at least pay expenses, but suppose there be no return loading, charge as above, — 1 ct. per b.

Profits. Add for profits $32 per load, more than 25 per cent. on the whole capital employed, — 2 cts. per b.

Total at tide, — 10 cts. per b.

But suppose the canal to terminate at Cumberland, (186 miles,) and the coal to be carried $7\frac{1}{2}$ miles on a rail-road, and to cost in the boats $4\frac{1}{2}$ cents instead of 2, as above, difference, — $2\frac{1}{2}$

$12\frac{1}{2}$ cts. per b.

The committee have thus adopted the most liberal allowances, more than they believe will be the actual cost; and they feel confident that the strictest scrutiny into all the elements of the calculation cannot increase the price they have adopted.

If then the bituminous coal from Cumberland can be delivered at tide, for this sum, of course it can be transported coastwise to all our Atlantic ports and towns cheaper than it can

be obtained from any other part of the world; and if so, can there be any assignable limit to the demand?

Let us see whether this position is sustained by facts. The cost of transporting coal from Philadelphia to Washington, (as a regular business and not as ballast,) is $1 50 per ton, or 5 cents per bushel; to Baltimore, coastwise or by rail-road from Point of Rocks, 4 cents per bushel; to Boston $2 per ton, or 7 cents per bushel, and it may be carried to Charleston, or the most distant of our seaports, for 8 cents per bushel, which is more than is received by importers from Liverpool, viz: cost at Liverpool 12½, duties 6 cents; deduct, also, insurance, commissions, wharfage, &c. from 28 cents per bushel, the price received by them in the American ports, and it leaves less than 8 cents for freight. Apply these facts, and the cost of Cumberland coal will be in our principal cities as follows, viz:

In Washington, Alexandria and Georgetown, (per bushel) 12½ cents

Present price $7 per ton or 25

Saving, 12½

In Baltimore it will be 16 cents, viz:

At Washington, 12½

Freight, 4

16½

Present price, 25

Saving, 8½

In Philadelphia it will cost 17½ cents, viz:

At Washington, 12½

Freight now paid, 5

17½

The price of bituminous coal is now $7 per ton, or 25

Saving, 7½

[At Philadelphia, anthracite is $5 per ton, or 17½ cents per bushel; so that the Cumberland will not affect the anthracite, but merely supply the bituminous coal, required for many uses to which the anthracite is inapplicable, viz: gas, coke, smith's shop, steam purposes, &c.]

In Boston it would cost 19½ cents, viz:

In Washington city,	12½
Freight,	7
	19½
Present price in Boston $9 per ton, or (per bushel)	32
Saving,	12½

Thus it appears, from well authenticated facts, collected with great pains, that Cumberland coal can be delivered, coastwise, at all our Atlantic cities and towns, cheaper than it can be obtained from any other part of the United States, or Europe; and of course the capacity of the canal to furnish it will be the only limit to the supply required.

(F.)

Charter of the Allegheny Coal Company.

SECTION 1. *Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania, in General Assembly met, and it is hereby enacted by the authority of the same,* That James Armstrong, jr., George Weller, John Mong, Jacob Myers, (G. S.) Samuel W. Pearson, Alexander B. Fleming, Jonathan Knepper, and Daniel Baird, and their associates, successors and assigns, be and they are hereby constituted a body corporate and politic, by the name, style and title of the "Allegheny Coal Company," for the purpose of mining coal, and for the transacting of the usual business of companies engaged in the mining, transporting to market, and selling of coal, and the other products of coal mines. And the said corporation, by the said name, is hereby declared and made capable in law to sue and be sued, to plead and be impleaded, to have a common seal, and the same to alter and renew at pleasure, to make rules and by-laws for the regulation and management of the said corporation, consistent with the laws of the United States, and of this Commonwealth, and generally to do and execute for the well being of said company, whatever shall lawfully pertain to such bodies politic: *Provided,* That nothing herein contained shall be considered as in any

way giving to said company any banking privileges, but they shall be exclusively confined to the operations pertaining to the business aforesaid, according to the true intent and meaning of this act: *And provided also*, That each stockholder shall be liable in his individual capacity for the debts, and performance of all contracts entered into by the said company, to the amount of the balance unpaid on the stock of said company.

SECTION 2. The said company shall have the right to hold either by purchase or lease, not exceeding two thousand acres of land at any one time, the whole to be within the townships of Southampton and Greenville, in the county of Somerset, in the commonwealth of Pennsylvania, and the same, or any part thereof, to sell, or otherwise dispose of, as the interest of the company may require: *Provided*, That the said company may hold, as above, such lot or lots of land, not exceeding five acres, in any one place, as may be found convenient as places of deposit in the transportation and sale of the products of their mines.

SECTION 3. The capital stock of said company shall be and consist of three hundred thousand dollars, and shall be divided into six thousand shares, of fifty dollars each; which capital stock shall only be employed in the holding and purchasing the lands aforesaid, with the improvements, if any thereon, and in constructing such other improvements, buildings, cars, boats, engines, and machinery, as may be necessary or useful for the mining, transportation, and sale of coal, and in the payment of such salaries, wages, and other expenditures, as shall be requisite for the purposes aforesaid, of the company; and the said stock shall be assignable and transferable, according to such rules as the board of directors shall establish.

SECTION 4. When the above named James Armstrong, jr., George Weller, John Mong, Jacob Myers, (G. S.) Samuel W. Pearson, Alexander B. Fleming, Jonathan Knepper, and Daniel Baird, and their associates, shall have subscribed the whole number of shares aforesaid, and actually paid and expended not less than fifteen per cent. of the capital, aforesaid, in purchasing lands, and in such other investments as are authorized by this act for the use of said company, the governor, on due evidence thereof, shall, by letters-patent, under his hand, and the seal of the state, create and erect the said James Armstrong, jr., George Weller, John Mong, Jacob Myers, (G. S.) Samuel W. Pearson, Alexander B. Fleming, Jonathan Knepper, Daniel Baird, and their associates, successors,

and assigns, into one body corporate, by the name, style and title of the " Allegheny Coal Company."

SECTION 5. The affairs of the said company shall be managed by seven directors to be chosen annually from the stockholders. The first election shall be held in the borough of Somerset, county of Somerset, within thirty days after letters-patent aforesaid, shall have been issued, of which election, public notice shall be given by four or more of the corporators named in the first section of this act, at least two weeks prior thereto, in two or more newspapers printed in the county of Somerset, and the subsequent elections shall be held annually, at such convenient time and place as the directors shall determine, of which thirty days previous notice, shall in like manner be given by the president of said company, or by any five of the directors: *Provided*, That in the event of a failure to hold such election, the former directors may continue in office for a period not exceeding six months, or until such election shall be held.

SECTION 6. The election for directors shall be held by ballot, and each stockholder shall be entitled to vote according to the number of shares held by said stockholder, in the proportion following, that is to say; for each share, and not exceeding four shares, one vote; for every two shares above four, and not exceeding ten, one vote; for every four shares above ten, and not exceeding thirty, one vote; for every ten shares above thirty, and not exceeding one hundred, one vote; for every twenty shares above one hundred, one vote. No share shall confer a right of voting which shall not have been transferred at least three calender months prior to the day of election, nor unless it be bona fide held or owned by the person in whose name it appears, in his own right, or in that of his wife, or for his or her sole use and benefit, or as executor or administrator, trustee or guardian, or in the right or for the use and benefit of some copartnership, society or corporation, of which he or she may be a member. And all votes by proxy, shall be on such terms and conditions as are prescribed by the act passed on the twenty-eighth day of March, one thousand eight hundred and twenty, entitled " an act to regulate proxies."

SECTION 7. The directors shall, as soon as conveninent after their election, choose one of their number as president, to serve for one year, they shall also have power to appoint as occasion may require, all other officers and agents of the company, and to supply vacancies in the board arising from death,

resignation or otherwise, until the next annual election. At all meetings of the board, four directors shall form a quorum to transact business.

SECTION 8. The directors may, from time to time, call in on thirty days notice thereof, in at least two newspapers printed in the county of Somerset, such instalments on the stock of said company, as they may judge best, not exceeding twenty per cent. thereof, at any one time and place appointed, and if any instalment of the stock so called in, shall remain unpaid for the space of thirty days after the time so appointed, every such stockholder, or his or her assignee, shall, in addition to the instalment so called for, pay at the rate of two per centum per month, for the delay of such payment, and if the same and additional penalty shall remain unpaid for such space of time, as that the accumulated penalty shall become equal to the sums before paid in part and on account of such shares, the same shall be forfeited to the said company, and may be sold to any person or persons willing to purchase for such prices as can be obtained for the same, or in default of payment by any stockholder of any such instalment as aforesaid, the president and directors may, at their election, cause suit to be brought before an alderman or justice of the peace, or in any court having competent jurisdiction, for the recovery of the same, together with the penalty aforesaid. *Provided*, That no stockholder, whether an original subscriber or assignee, shall be entitled to vote at any election or at any general or special meeting of the said company, on whose share or shares any instalments or arrearages may be due and payable more than thirty days previously to the said election or meeting.

SECTION 9. Dividends of so much of the profits of the company, as shall appear to the directors advisable, shall be declared twice a year, and paid to the stockholders or their legal representatives on demand, at any time after the expiration of ten days after having been declared, but said dividends shall in no case exceed the amount of net profits actually acquired by the company, so that the capital stock shall never thereby be impaired, and if any dividend shall be declared which shall impair the capital stock of the said company, the directors consenting thereto shall be liable in their individual capacities to said company, for the amount of the stock so divided, and each director present when such dividend shall be declared, shall be adjudged consenting thereto, unless he shall forthwith give public notice to the stockholders of the declaring of such dividend. *Provided*, That whenever the dividends shall exceed six per

cent. per annum, the said company shall pay a tax of eight per cent. on all such dividends into the treasury of the state, for the purposes of education, and the president of said company shall annually in the month of January, transmit to the legislature under oath or affirmation, a statement of the receipts and expenditures thereof, and of any dividends which may have been declared during the preceding year.

Section 10. It shall not be lawful for the said president, directors and company, nor any of their agents, nor any other person whatever employed by or under them, or any of them, for the purpose contemplated in this act, to enter upon any land which they shall deem necessary for the construction and completion of the said rail-road or rail-roads, or any part thereof, either by the making of any excavation or embankments, or for the mere purpose of searching for stone, earth or gravel, or for the felling of timber for the construction and completion of the said road or roads, until the rate of compensation for injury sustained or to be sustained by reason of the construction thereof, shall have been previously ascertained and paid, or the amount thereof secured in such a manner as shall prove satisfactory to the owner or owners of such land, which said compensation if the parties cannot agree thereon, shall be ascertained in the same manner as is prescribed and provided for in the fifteenth section of the act of the sixth day of April, one thousand eight hundred and thirty, incorporating the Middleport and Pine Creek Rail-road Company.

Section 11. Any legal process served on any agent or manager of said company, is hereby declared to be to all intents and purposes as valid as the same would have been if served on the president and directors thereof.

Section 12. The company hereby incorporated shall have power to construct rail-roads with one or more tracts from any point or points on their land, to the Maryland line, in the direction of Cumberland. Said company shall have the same powers and immunities, and be subject to the same terms and conditions that are provided for in the act to incorporate the Beaver Meadow Rail-road and Canal Company, and the supplements thereto. *Provided*, That the said company shall not prevent any person or persons, company or companies, hereafter incorporated, being the owner or owners of land bordering on the said rail-road or rail-roads, or adjacent thereto from making lateral rail-roads, and to connect them with said rail-road or rail-roads, from their said lands, as the said person or persons, company or companies, may conceive necessary for

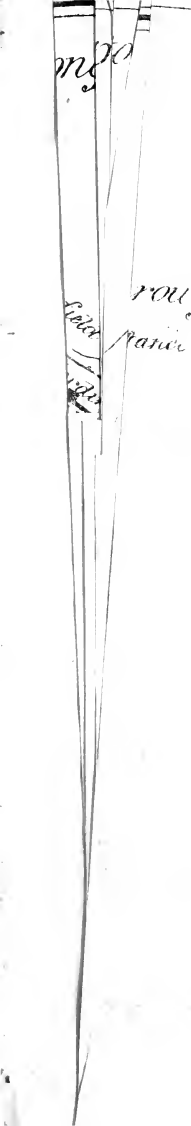
the purpose of transporting their coal or produce upon said rail-road or rail-roads, subject to the payment of the same rates of toll now charged by the Minehill and Schuylkill Haven rail-road, by virtue of the sixth section of the supplement of their act of incorporation, passed on the twenty-third day of March, one thousand eight hundred and thirty-two, and that the turn-outs for such lateral roads shall be so constructed and kept as not to interfere with the use of the main road or roads, and all cars or wagons run upon the same, shall be subject to such rules and regulations as may be prescribed by the company, and be intended to keep the track of said road or roads, free and open for the uninterrupted passage of the cars of every person desiring to travel thereon.

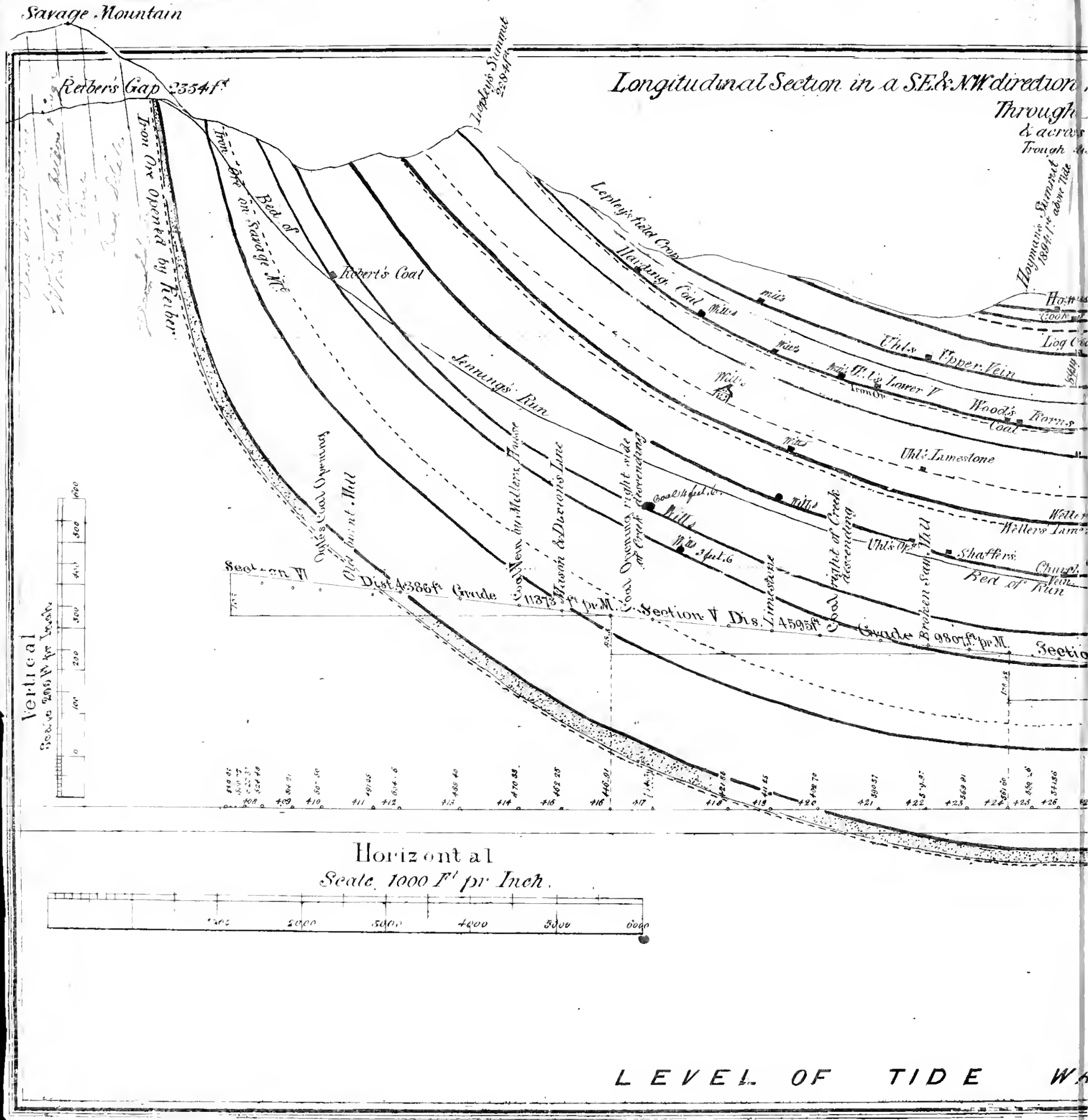
SECTION 13. This act shall continue and be in force until the first day of May, in the year of our Lord, one thousand eight hundred and sixty-five. *Provided*, That it shall be lawful for the legislature at any time, to amend or repeal any of the foregoing provisions, and to rescind the powers hereby granted, in such manner however, that no injury may be done to the coporators.

WM. HOPKINS,
Speaker of the House of Representatives.
CHARLES B. PENROSE,
Speaker of the Senate.

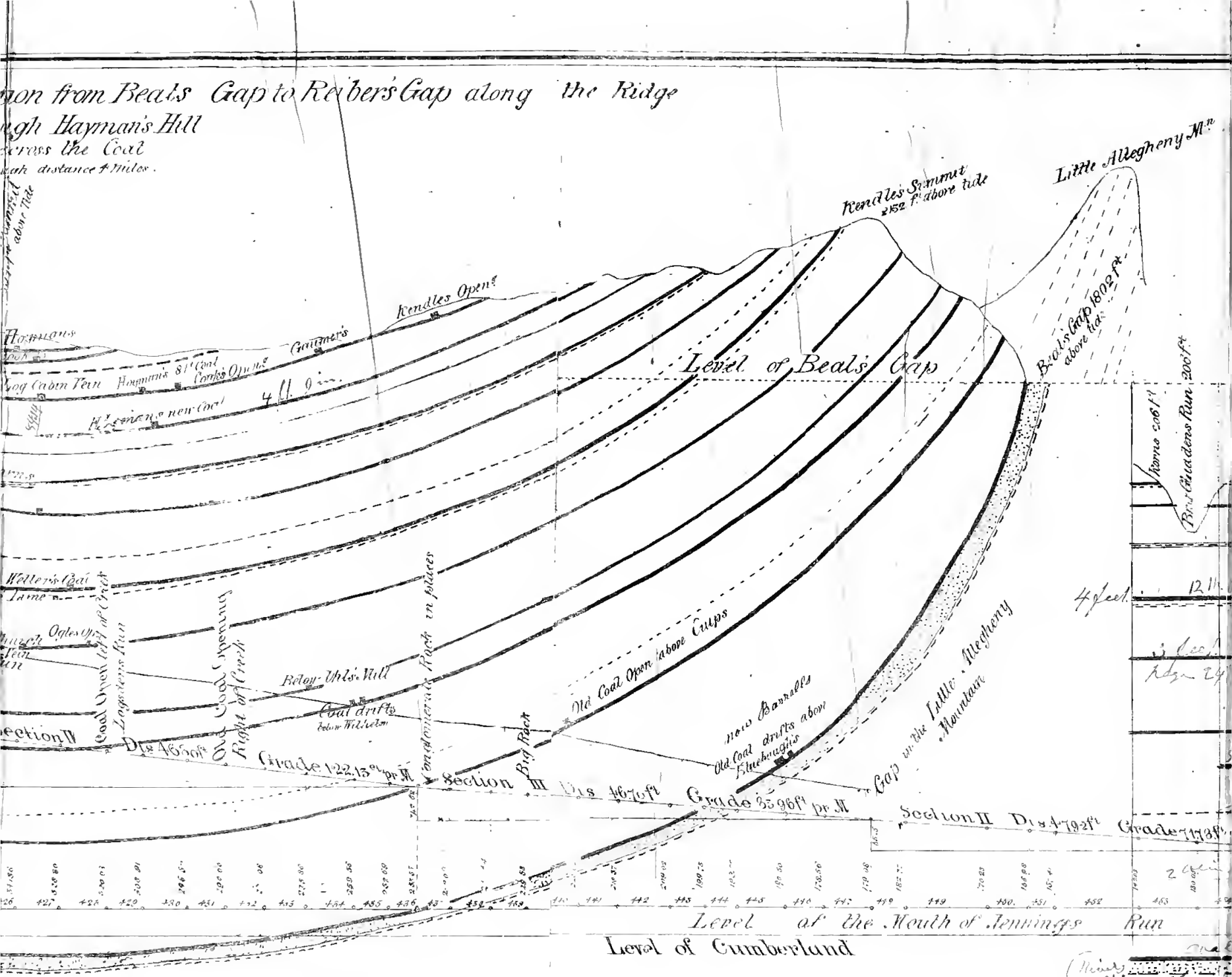
APPROVED—This twenty-fifth day of May, A. D. eighteen hundred and thirty-nine.

DAVID R. PORTER.


Summit near Hoyman's



Savage Mountain
Reiber's Gap 2354 ft
Longitudinal Section in a S.E. & N.W. direction
Through
& across
Trough
Iron Ore Opened by Reiber
Iron Ore on Savage Mt.
Bed of
Robert's Coal
Lepley's Summit 2284 ft
Lepley's field Crop
Harding Coal
Wills
Uhl's Upper Vein
Uhl's Lower V
Iron Ore
Wood's Korns Coal
Uhl's Limestone
Hoyman's Summit 1894 ft above Tide
Log Co
Jennings' Run
Coal Vein by Millers House
Mason & Dixon's Line
Coal Opening right side of Creek descending
Coal 4 feet 6
Wills 3 feet 6
Limestone
Coal right of Creek descending
Broken Saw Mill
Uhl's Opn
Shaffers
Bed of Run
Wellers Lim
Ogle's Coal Opening
Old burnt Mill
Section VI Dist. 4386 ft Grade 11373 ft pr M.
Section V Dis. 4595 ft Grade 9807 ft pr M.
Section
Vertical
Scale 200 ft pr Inch
Horizontal
Scale 1000 Ft pr Inch.
2000
3000
4000
5000
6000
LEVEL OF TIDE W



SECTIONS

Illustrative of the Geological Character & Mineral Beds of the

SAVAGE MOUNTAIN COAL TROUGH

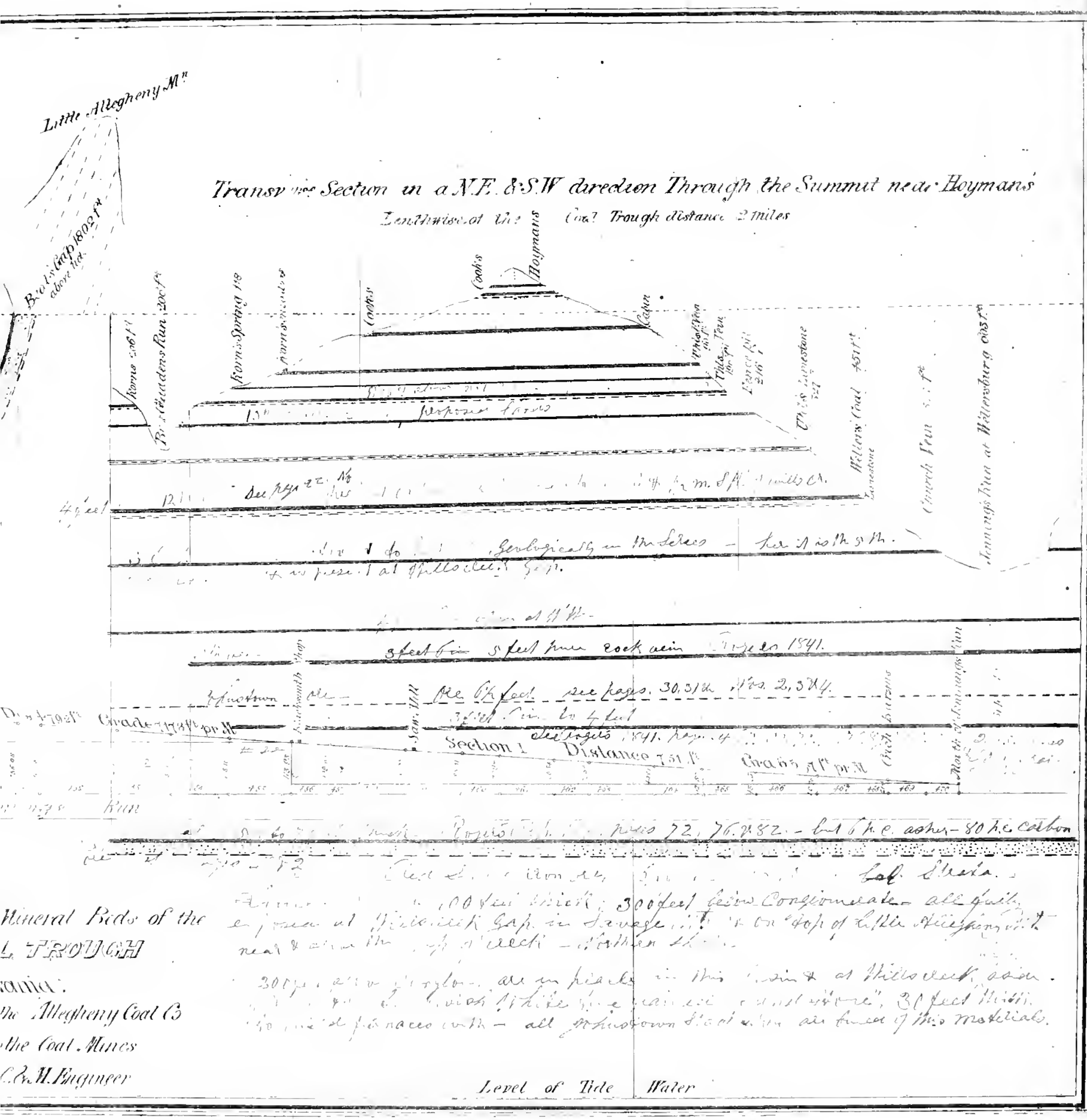
in Somerset Co. Pennsylvania.

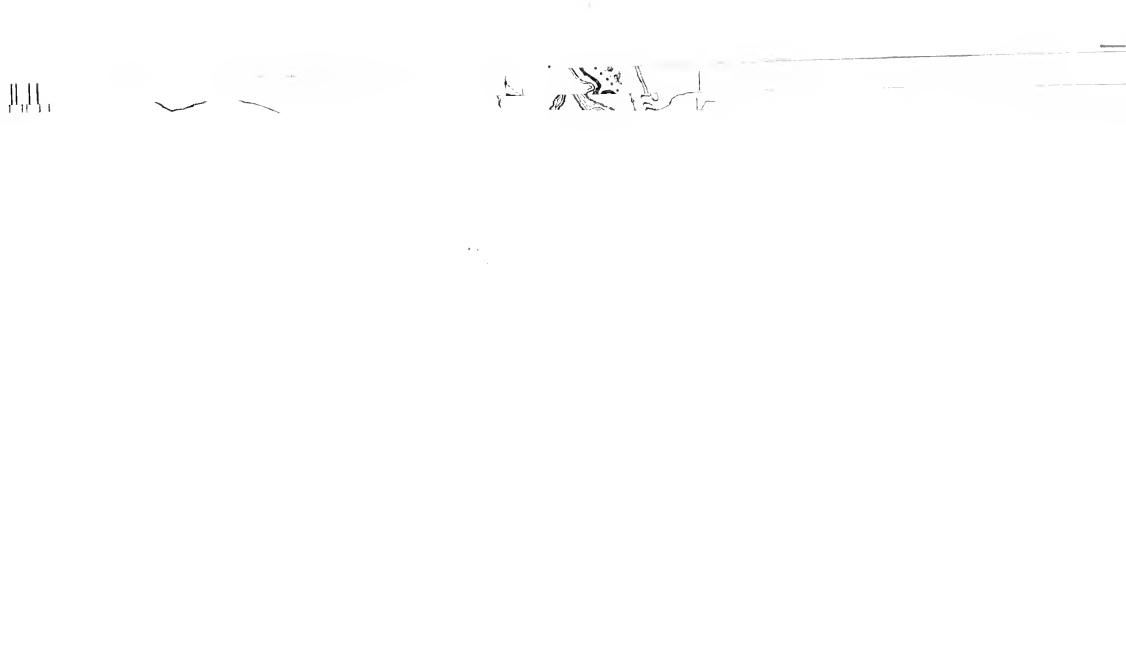
With the Profile of a Rail Road to the lands of the Allegheny Coal Co.

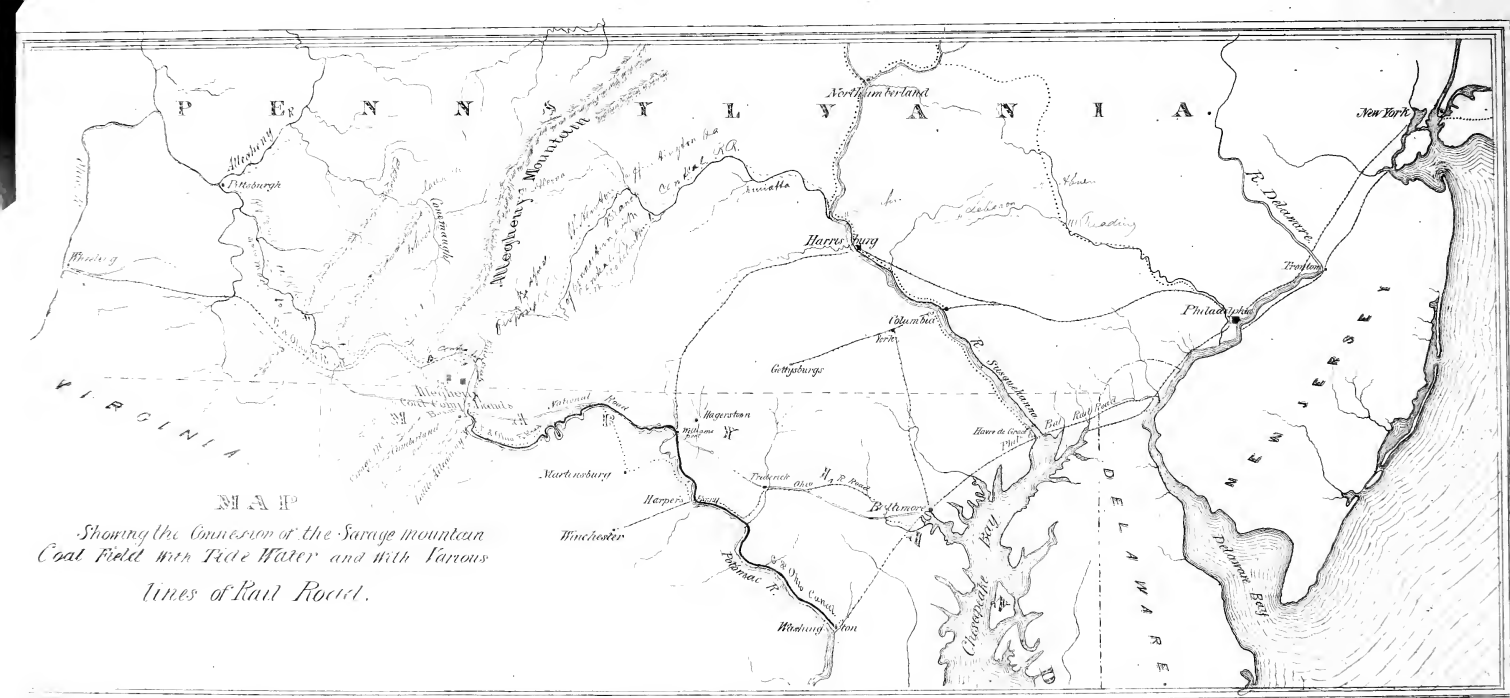
from the mouth of Jennings' Run to the Coal Mines

Prepared by Walter R. Johnson. A.M. C.E. & M. Engineer.

WATER

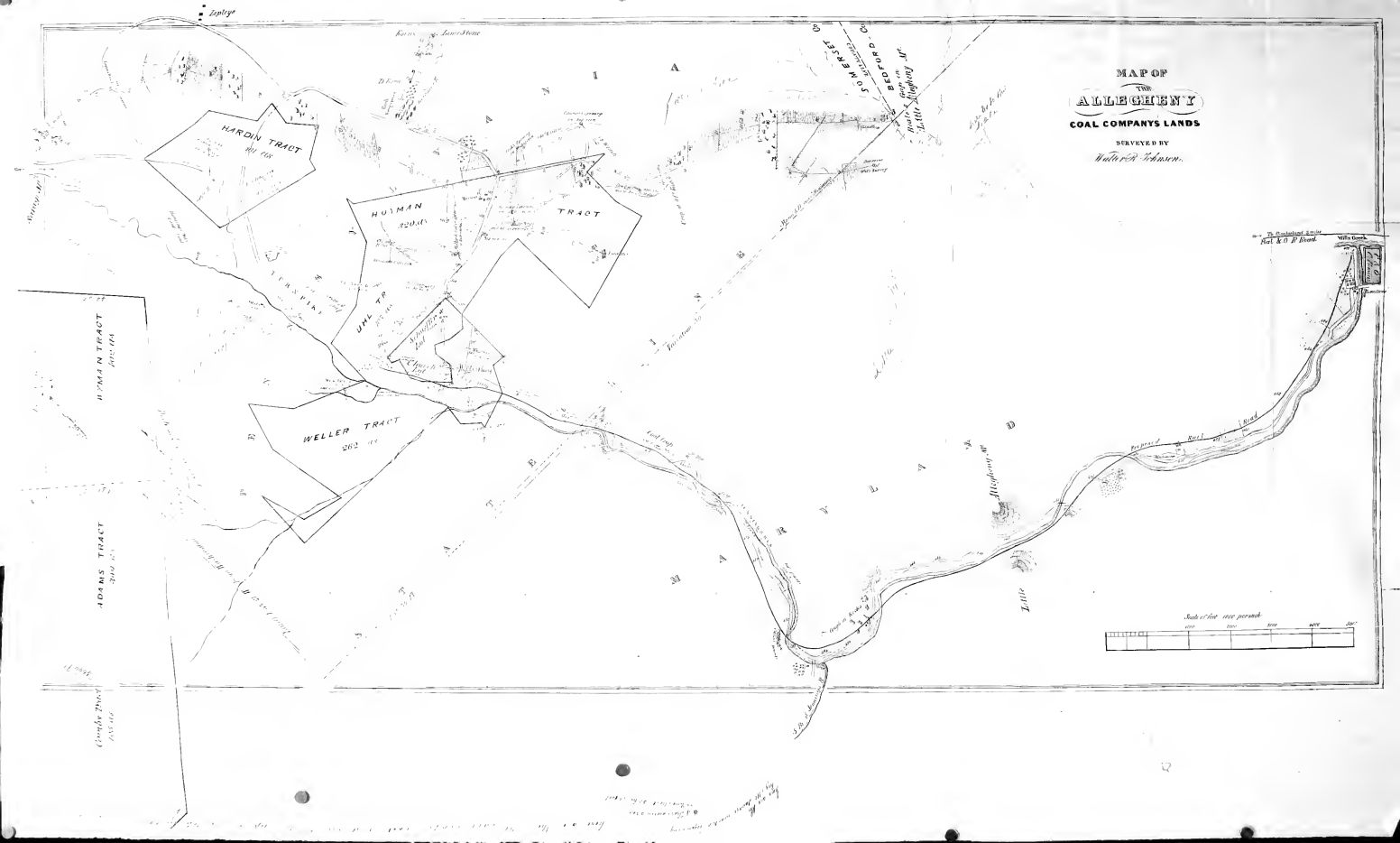
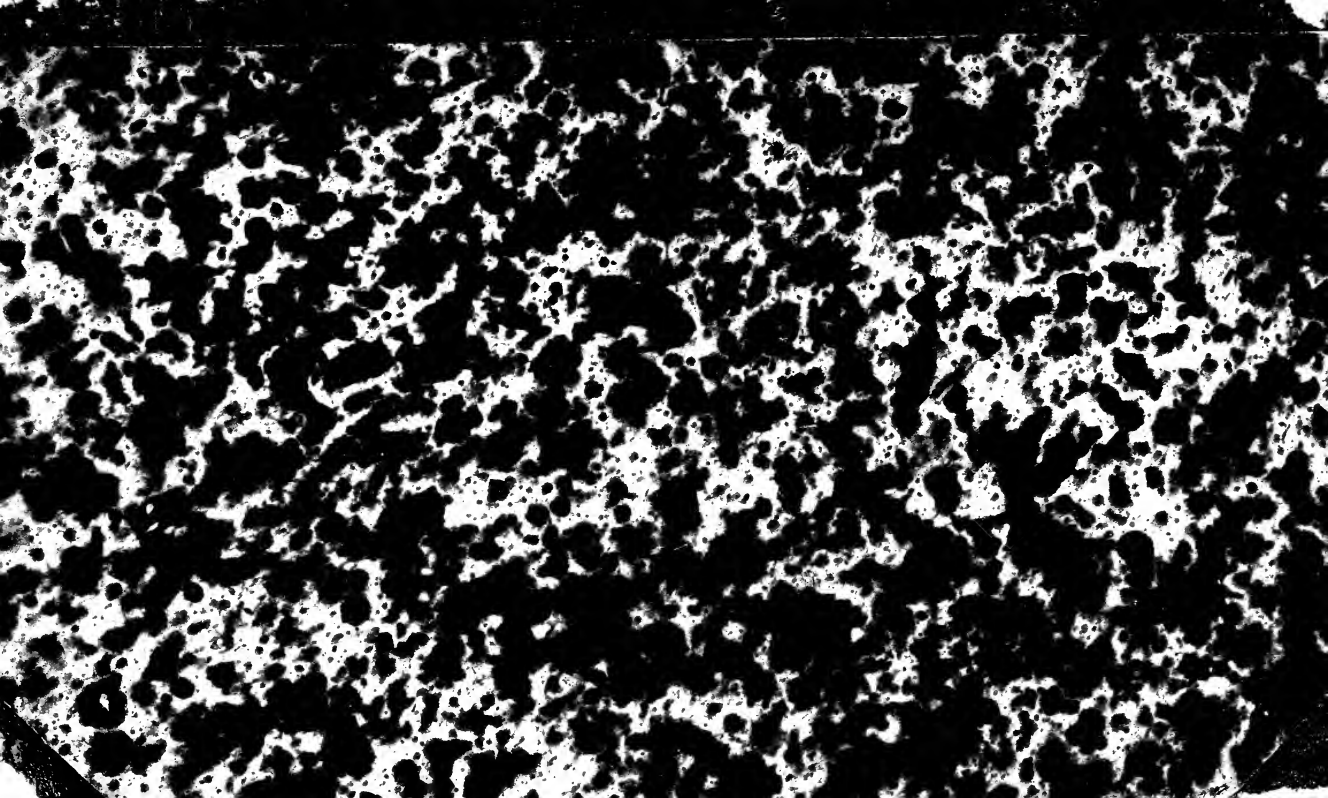

Little Allegheny Mn
Transv. Section in a N.E. & S.W. direction Through the Summit near Hoyman's
Lenthwise of the Coal Trough distance 2 miles
Cooks
Hoymans
Cabin
Korns Spring 118
Korns Meadows
Korns 206 ft
Bro Gladdens Run 206 ft
Bro's Gap 1802 ft above tide
Thls Vein
Thls Limestone
Wellers Coal 451 ft
Church Vein
Jennings Run at Wellersburg 605 ft
proposed Lands
See page 22 No
4 feet
Geologically in the Series
Ore 6½ feet see pages 30, 31 & Nos 2, 3 & 4
Grade 7178 ft pr M
Section 1
Distance 751 ft
Grade 5 ft pr M
Rogers 1841
Run
Ore 6½ feet
Mineral Beds of the
L TROUGH
ania:
the Allegheny Coal Co
the Coal Mines
C. & M. Engineer
Level of Tide Water





MAP

Showing the Connexion of the Savage mountain Coal Field with Tide Water and with Various lines of Rail Road.


MAP OF
THE
ALLEGHENY
COAL COMPANYS LANDS
SURVEYED BY
Walter R. Johnson.
HARDIN TRACT
HOYMAN
TRACT
WELLER TRACT
262 ac
HYMAN TRACT
ADAMS TRACT
Laptego
Farm of Lame Stone
SOMERSET Co
BEDFORD Co
Allegheny Mt
Scale of feet over periods
Nat. & O. R. Road
Willis Creek
Allegheny Mt
Little